

12.0 MAGNUSON-STEVENSON FISHERY CONSERVATION AND MANAGEMENT ACT

Public Law 104-267, the Sustainable Fisheries Act of 1996, amended the Magnuson-Stevens Act to establish new requirements for essential fish habitat (EFH) descriptions in Federal fishery management plans and to require Federal agencies to consult with NMFS on activities that may adversely affect EFH. EFH means “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (Magnuson-Stevens Act, Section 3).” The Secretary of Commerce has designated EFH for the Federally managed groundfish, coastal pelagics, and Pacific salmon fisheries (PFMC 1998a,b, PFMC 1999) as those waters and substrate necessary to ensure the production needed to support a long-term sustainable fishery. That is, EFH provides the properly functioning habitat conditions necessary for the long-term survival of the species over the full range of environmental variation.

The Magnuson-Stevens Act consultation requirements apply to all actions that may adversely affect EFH, regardless of their location. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities that may have an adverse effect on EFH.

The consultation requirements of Section 305(b) of the Magnuson-Stevens Act [16 USC 1855(b)] provide that:

- Federal agencies must consult with NMFS on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.
- NMFS shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.
- Federal agencies shall, within 30 days after receiving conservation recommendations from NMFS, provide NMFS with a detailed response in writing regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NMFS, the Federal agency shall explain its reasons for not following the recommendations.

12.1 ESSENTIAL FISH HABITAT IN THE COLUMBIA RIVER BASIN

The Columbia River estuary and the Pacific Ocean off the mouth of the Columbia River are designated EFH for groundfish and coastal pelagic species (see Table 12.1-1, PFMC 1998a,b). The marine extent of groundfish and coastal pelagic EFH includes waters from the nearshore and tidal submerged environments within Washington, Oregon, and California state territorial waters out to the exclusive economic zone (370.4 km) offshore between the Canadian border to the north and the Mexican border to the south.

PFMC has recommended to the Secretary of Commerce an EFH designation for the Pacific salmon fishery that includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California, except above the impassable barriers identified by PFMC (1999). Chief Joseph Dam, Dworshak Dam, and the Hells Canyon Complex (Hells Canyon, Oxbow, and Browne dams) are among the listed manmade barriers that represent the upstream extent of the Pacific salmon fishery EFH. Salmon EFH excludes areas upstream of longstanding, naturally impassable barriers (e.g., natural waterfalls in existence for several hundred years). In the estuarine and marine areas, the designated salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone (370.4 km) offshore of Washington, Oregon, and California north of Point Conception (PFMC 1999).

Table 12.1-1. Species with designated EFH found in waters of proposed FCRPS action area.

Groundfish Species	Blue rockfish (<i>S. mystinus</i>)	Rougheye rockfish (<i>S. aleutianus</i>)	Flathead sole (<i>Hippoglossoides elassodon</i>)
Leopard shark (<i>Triakis semifasciata</i>)	Bocaccio (<i>S. paucispinis</i>)	Sharpchin rockfish (<i>S. zacentrus</i>)	Pacific sanddab (<i>Citharichthys sordidus</i>)
Southern shark (<i>Galeorhinus galeus</i>)	Brown rockfish (<i>S. auriculatus</i>)	Shortbelly rockfish (<i>S. jordani</i>)	Petrale sole (<i>Eopsetta jordani</i>)
Spiny dogfish (<i>Squalus acanthias</i>)	Canary rockfish (<i>S. pinniger</i>)	Shorttraker rockfish (<i>S. borealis</i>)	Rex sole (<i>Glyptocephalus zachirus</i>)
Big skate (<i>Raja binoculata</i>)	Chilipepper (<i>S. goodei</i>)	Silvergray rockfish (<i>S. brevispinus</i>)	Rock sole (<i>Lepidopsetta bilineata</i>)
California skate (<i>R. inornata</i>)	China rockfish (<i>S. nebulosus</i>)	Speckled rockfish (<i>S. ovalis</i>)	Sand sole (<i>Psettichthys melanostictus</i>)
Longnose skate (<i>R. rhina</i>)	Copper rockfish (<i>S. caurinus</i>)	Splitnose rockfish (<i>S. diploproa</i>)	Starry flounder (<i>Platyichthys stellatus</i>)
Ratfish (<i>Hydrolagus collicii</i>)	Darkblotched rockfish (<i>S. crameri</i>)	Stripetail rockfish (<i>S. saxicola</i>)	
Pacific rattail (<i>Coryphaenoides acrolepis</i>)	Grass rockfish (<i>S. rastrelliger</i>)	Tiger rockfish (<i>S. nigrocinctus</i>)	Coastal Pelagic Species
Lingcod (<i>Ophiodon elongatus</i>)	Green-spotted rockfish (<i>S. chlorostictus</i>)	Vermillion rockfish (<i>S. miniatus</i>)	Northern anchovy (<i>Engraulis mordax</i>)
Cabezon (<i>Scorpaenichthys marmoratus</i>)	Green-striped rockfish (<i>S. elongatus</i>)	Widow Rockfish (<i>S. entomelas</i>)	Pacific sardine (<i>Sardinops sagax</i>)
Kelp greenling (<i>Hexagrammos decagrammus</i>)	Longspine thornyhead (<i>Sebastolobus altivelis</i>)	Yelloweye rockfish (<i>S. ruberrimus</i>)	Pacific mackerel (<i>Scomber japonicus</i>)
Pacific cod (<i>Gadus macrocephalus</i>)	Shortspine thornyhead (<i>Sebastolobus alascanus</i>)	Yellowmouth rockfish (<i>S. reedi</i>)	Jack mackerel (<i>Trachurus symmetricus</i>)
Pacific whiting (Hake) (<i>Merluccius productus</i>)	Pacific Ocean perch (<i>S. alutus</i>)	Yellowtail rockfish (<i>S. flavidus</i>)	Market squid (<i>Loligo opalescens</i>)
Sablefish (<i>Anoplopoma fimbria</i>)	Quillback rockfish (<i>S. maliger</i>)	Arrowtooth flounder (<i>Atheresthes stomias</i>)	
Aurora rockfish (<i>Sebastes aurora</i>)	Redbanded rockfish (<i>S. babcocki</i>)	Butter sole (<i>Isopsetta isolepis</i>)	Salmon
Bank Rockfish (<i>S. rufus</i>)	Redstripe rockfish (<i>S. proriger</i>)	Curlfin sole (<i>Pleuronichthys decurrens</i>)	Coho salmon (<i>O. kisutch</i>)
Black rockfish (<i>S. melanops</i>)	Rosethorn rockfish (<i>S. helvomaculatus</i>)	Dover sole (<i>Microstomus pacificus</i>)	Chinook salmon (<i>O. tshawytscha</i>)
Blackgill rockfish (<i>S. melanostomus</i>)	Rosy rockfish (<i>S. rosaceus</i>)	English sole (<i>Parophrys vetulus</i>)	

Sources: Casillas et al. 1998, Eschmeyer et al. 1983, Miller and Lea 1972, Monaco et al. 1990, Emmett et al. 1991, Turner and Sexsmith 1967, Roedel 1953, Phillips 1957, Roedel 1948, Phillips 1964, Fields 1965, Walford 1931, Gotshall 1977, Hart 1973, Healey 1991, Sandercock 1991, and Dees 1961.

12.2 SUMMARY OF PROPOSED ACTION

Below is a brief description of the proposed action. For a more detailed description, see Section 3.

12.2.1 Operation and Configuration of FCRPS

The FCRPS serves an array of individual project and system purposes. Individual purposes vary widely and may include power generation, flood control, irrigation, recreation, and fish and wildlife benefits. Congress authorized all 30 of BOR's projects in the basin to provide water for irrigated agriculture; all the projects except Hungry Horse Dam and Reservoir currently fulfill the congressional mandate.

12.2.2 Flow Objectives for Salmon and Steelhead

The Action Agencies recommend that mainstem flow operations be based on the 1995 RPA as supplemented by the 1998 FCRPS Biological Opinion. System operators will continue to confer with NMFS and the regional fisheries comanagers to determine how to best manage in-season conditions relative to the seasonal average flow objectives.

For fall chinook and chum salmon spawning below Bonneville Dam, the FCRPS would be operated to use storage to augment natural flows, attempting to provide a flow level of 125 kcfs during early November through early April while maintaining the 1995 RPA requirement for storage projects to be at their upper (flood control) rule curve elevation on April 10 of each year. As natural conditions permit, a conservative stepwise approach would allow higher flows during late fall and early winter.

12.2.2.1 Water Quality

The Action Agencies propose to continue to operate the FCRPS to reduce water temperatures during periods of juvenile and adult fish migration and to minimize the harmful effects of elevated levels of spill-generated TDG on anadromous and resident fish.

12.2.2.2 Specific Project Operations

See Section 3 for a detailed discussion of specific project operations.

12.2.2.3 Spill for Fish Passage

Spill reduces turbine-related mortality of juvenile salmon and steelhead at lower Snake and Columbia River hydroelectric projects. It will be maintained at the levels recommended in the 1998 FCRPS Supplemental Biological Opinion, assuming that variances to exceed 110% TDG state water quality standards are obtained from Oregon and Washington.

12.2.2.4 Juvenile Fish Transportation

Juvenile salmonids would be collected at several dams on the lower Snake and Columbia rivers and transported downstream by truck or barge to release points below Bonneville Dam in an effort to improve survival over that experienced by inriver migrants.

12.2.2.5 Minimum Operating Pool (MOP)

Some mainstem run-of-river FCRPS reservoirs on the lower Snake River and John Day Reservoir on the Columbia River would be lowered during the spring and summer migration periods to increase water velocity (intended to increase the migration rate and survival of salmon).

12.2.2.6 Peak Turbine Efficiency Operation

The Action Agencies would operate turbines at the eight FCRPS mainstem Snake and Columbia river projects at high efficiency (within 1% of peak operating efficiency) to reduce the mortality of fish passing through the turbines.

12.2.2.7 Fish Passage Facilities

Turbine intakes with bypass/collection facilities at Lower Granite, Little Goose, Ice Harbor, Lower Monumental, McNary, John Day, and Bonneville dams would be screened. An ice and trash sluiceway passage would be provided at The Dalles Dam. Water would be spilled through the spillway to enhance fish passage.

12.2.2.8 Predator Control Program

The Northern Pikeminnow Management Program would continue. Efforts to relocate Caspian terns from Rice Island would continue.

12.2.2.9 Adaptive Management Framework Through Adoption of Performance Measures

Use of adaptive management would avoid jeopardy and facilitate the future recovery of listed stocks. Applying the “Construct for Achieving Survival Improvements” (BPA et al. 1999) would establish measurable biological performance standards for the hydrosystem, prioritize actions, and estimate the likely outcome of future actions. Ongoing studies would aid in evaluating the feasibility of lower Snake River actions, such as dam breaching, and the John Day phase 1 report (Corps 2000b) that addresses juvenile fish passage alternatives. Measures would be undertaken to improve TDG and temperature conditions for the benefit of anadromous and resident species. Changes in storage project operations and configurations in the Snake and

lower Columbia rivers would benefit anadromous species. The Action Agencies' Construct would establish an overall recovery goal.

The Action Agencies recommend that interim performance standards be developed during consultation to enhance decision-making and to provide a model for developing performance standards for the Basinwide Recovery Strategy.

12.2.2.10 NMFS' Issuance of Section 10 Permit for JFT

NMFS extended the Corps' existing Permit 895 under authority of Section 10 of the ESA and the NMFS regulations governing ESA-listed fish and wildlife permits (50 CFR Parts 217 through 227). The permit is valid until December 31, 2000. The Corps has conducted a feasibility study (Corps 1999c) to evaluate several alternatives to juvenile fish transportation. Permit 895 also authorizes the Corps' annual incidental takes of ESA-listed adult fish associated with fallbacks through the juvenile fish bypass systems at the four dams.

12.3 EFFECTS OF PROPOSED ACTION

12.3.1 General Considerations

As described above in Section 5.3, the activities proposed for the configuration and operation of the FCRPS are likely to continue to reduce the function of already impaired EFH and retard the long-term progress of the impaired habitat toward properly functioning conditions. Direct effects of the FCRPS on EFH include blockage of habitat and habitat alteration.

By providing a storage capacity for almost 40% of the average annual runoff of the Columbia River above Bonneville Dam and operating to meet electrical generation, flood control, and irrigation demands, reservoir operations have changed streamflow conditions affecting turbidity and sediment transport, estuary conditions, and the extent and characteristics of the Columbia River plume. Reservoir operations on the mainstem Columbia and Snake rivers have altered the natural runoff pattern in the basin by increasing fall and winter flows, decreasing spring and summer flows, and effectively increasing the cross-sectional area of the river, resulting in downstream migration delays. Reduced flows result in substantial modification of the rivers' thermal regime and water quality by increasing water temperatures and altering water chemistry.

The effects of water regulation and impoundments effectively transform an ecosystem dependent on moving water (lotic habitat) into one dependent on still water (lentic habitat). This results in substantial changes in the distribution, abundance, and diversity of organisms and in the carrying capacity of the habitat, as well as changed predator-prey dynamics. Because reservoirs have low water velocity, changes in water temperature, dissolved oxygen levels, turbidity, water chemistry, and aquatic habitat may result. Thermal and chemical stratification are likely to occur, with potentially significant effects on associated aquatic life in and downstream of the

reservoir. Specific downstream effects are likely to depend on site, water quality, size of impoundment, and facility design.

12.3.2 Estuary and Nearshore Essential Fish Habitat

12.3.2.1 Groundfish EFH

Flow changes in the estuary as a result of changes in the FCRPS have the potential to adversely affect estuarine EFH for groundfish and coastal pelagic species, primarily by altering the distribution of salt water and freshwater. Increased river flow will decrease both the extent and the duration of intrusion by salt water into the estuary, while decreased river flows will do the opposite. Changes in flow can also affect the nearshore ocean environment by altering the size of the freshwater plume, which will alter the availability of habitat in the immediate area offshore of the mouth of the Columbia River. Predicting the precise impact on EFH is not possible until the relationship between the physical parameters of the plume and the biology of fish is better understood.

The estuary is used by juveniles of several groundfish species as a rearing area. The dominant species in the Columbia River are starry flounder and English sole. They occur in the estuary primarily as different-age juveniles that use the channel as a migratory corridor to rearing areas in the bays and intertidal areas. These areas have large concentrations of food organisms such as the amphipod *Corophium salmonis* and are important rearing habitat. The less-than-1-year-old juveniles occur throughout the estuary, but are more concentrated in the freshwater and low-salinity areas. They are generally not as abundant in the estuary as the older age classes. One- to 2-year-old juveniles occur throughout the estuary, but are abundant year-round in the side channels and bays and also in the main navigation channel. Two-year-old juveniles are less widespread and occur mostly in the higher-salinity parts of the lower estuary.

Altering the flow patterns has the potential to affect the value of these habitats for rearing juvenile flounders if the change occurs in the summer when they are in the estuary. The dominant flatfish species is the starry flounder, which is euryhaline and extremely tolerant of wide ranges of salinity. Starry flounder, for example, have been captured as far upstream as Portland in totally freshwater systems. Consequently, unless the change from altering flow patterns is extremely large, it is unlikely that it will have an effect beyond that to which this species can adjust. Altering salinity patterns may also affect prey items for groundfish species, which could conceivably affect rearing success. These species are generalist feeders and would probably find other prey items if one group was negatively affected by a change in flow patterns.

12.3.2.2 Coastal Pelagics EFH

Only the northern anchovy of the coastal pelagic group uses the Columbia River estuary to any extent. Individuals that occur in the estuary are an extension of the coastal population and occur primarily in the lower estuary, where salinity is high. Though anchovies spawn in the ocean, all

life stages can occur in the estuary. Eggs and larvae can apparently be swept into the estuary by flood tides. Individuals less than 1 year old, however, are not abundant in the estuary, whereas anchovies 1 year or older actively move into the estuary and can be abundant, particularly during periods of low river flow, when salinity is high. Anchovies are pelagic feeders, feeding primarily on copepods.

Changes in flow regulation are not expected to adversely affect anchovy EFH in the Columbia River, because all areas except the lower estuary are used irregularly. High river flows may reduce the extent of this upstream, marginally important, habitat for anchovies.

12.3.2.3 Salmon EFH

Flow changes in the estuary as a result of changes in the FCRPS have the potential to adversely affect estuarine EFH for chinook and coho salmon, primarily by altering the distribution of salt water and freshwater. Increased river flow will decrease both the extent and the duration of intrusion by salt water into the estuary, while decreased river flows will do the opposite. Changes in flow can also affect the nearshore ocean environment by altering the size of the freshwater plume, which will change the availability of habitat in the immediate area offshore of the mouth of the Columbia River. Predicting the precise impact on EFH is not possible until the relationship between the physical parameters of the plume and the biology of salmon is better understood.

Water developments in the Columbia River have reduced average flow, altered the seasonality of Columbia River flows and sediment discharge, and changed the estuarine ecosystem (NRC 1996; Sherwood et al. 1990; Simenstad et al. 1990, 1992; Weitkamp 1994). Annual spring freshet flows (May and June) through the Columbia River estuary are about 70% of predevelopment levels, and total sediment discharge is about one-third of 19th-century levels.

Decreased spring flows and sediment discharges have also reduced the extent, speed of movement, thickness, and turbidity of the plume that extended far out and south into the Pacific Ocean during the spring and summer (Barnes et al. 1972, Cudaback and Jay 1996; Hickey et al. 1998). Percy (1992) suggested that low river discharge is unfavorable for juvenile salmonid survival, despite some availability of nutrients from upwelling, because of reduced turbidity in the plume (increasing foraging efficiency of birds and fish predators, increased residence time of the fish in the estuary and near the coast where predation is high, decreased incidence of fronts with concentrated food resources for juvenile salmonids, and reduced overall total secondary productivity based on upwelled and fluvial nutrients). Reduced secondary productivity not only affects salmonid food sources, but also focuses predation by other fishes and birds on the juvenile salmonids.

Because of decreased river flows and development of the hydrosystem, juvenile migrant salmon probably arrive in the estuary later than under conditions in which they evolved. Efforts to make conditions in the Columbia River plume similar to those that existed before development of the

hydrosystem would likely benefit salmonids (NRC 1996). Although the effects of reduced or altered flow timing from individual tributaries (e.g., the Snake River) in the estuary and nearshore ocean are minimal, collectively they are not.

Small changes in salinity distribution may have significant effects on the ecology of fishes, including salmonids. Salinity distribution, as affected by tidal flow and river discharge, is a primary factor explaining seasonal species distributions and the structure of entire assemblages of fish and epibenthic and benthic invertebrate prey species throughout the Columbia River estuary (Haertel et al. 1969; Bottom and Jones 1990; Jones et al. 1990). By altering the distribution of preferred habitats within particular salinity ranges and the particular suite of species that salmon encounter at different locations during their estuarine residence, small changes in salinity structure may have consequences for estuarine food webs and fish production in the estuary. In particular, small changes in the distribution and gradient of oligohaline salinities could change the type of habitats available when juvenile salmon must make the critical physiological transition from riverine to brackish salinities. Assessments of the ecological effects of salinity change on estuarine fishes, rearing conditions at specific places, and times that support at-risk populations are needed to assess the impacts of altered flow regimes in the estuary.

12.3.2.4 Mainstem Essential Fish Habitat

Mainstem EFH provides the migratory corridor for juvenile salmonids and returning adults. In the Columbia River basin, dams built to provide hydropower and reservoirs built for water storage and flood control may adversely affect salmon EFH. Potential adverse effects include impaired fish passage (including blockages and diversions); altered water temperature, water quality, water quantity, and flow patterns; interrupted transport of the nutrients, large woody debris, and sediment that affect river, wetland, riparian, and estuarine systems; increased competition with non-native species; and increased predation and disease.

Hydrologic effects of dams include water-level fluctuations, altered seasonal and daily flow regimes, reduced water velocities, and reduced discharge volume. These altered flow regimes can affect the migratory behavior of juvenile salmonids. Water-level fluctuations associated with hydropower peak operations may reduce habitat availability, inhibit the establishment of aquatic macrophytes that provide cover for fish, and sometimes strand fish or allow desiccation of spawning redds. Drawdowns reduce available habitat area and concentrate organisms, potentially increasing predation and transmission of disease (Spence et al. 1996). Drawdown in the fall for flood control produces high flows during spawning. The high flows allow fish to spawn in areas that may not have water during the winter and spring, resulting in loss of the redds.

12.4 CONCLUSION

NMFS believes that the proposed action may adversely affect designated EFH for groundfish and coastal pelagics listed in Table 12.1-1 and designated EFH for chinook and coho salmon.

12.5 EFH CONSERVATION RECOMMENDATIONS

Conservation measures are discretionary measures suggested to avoid, minimize, or otherwise offset adverse modification of EFH, or to develop additional information. The RPA detailed in Section 9, along with the reasonable and prudent measures and the terms and conditions that implement them (listed in Sections 10.4 and 10.5), are applicable to designated groundfish and coastal pelagics EFH and designated Pacific salmon EFH.

Because listed fish in the Columbia River are in such precarious condition, the habitat strategy is intended to accelerate efforts to help fish in priority areas in the short term, while laying a foundation for long-term strategies through subbasin and watershed assessment and planning.

In the short term, in the Basinwide Recovery Strategy, Federal agencies commit to focus immediate attention on priority subbasins, i.e., those with potential for significant improvement in anadromous fish productive capacity as a result of habitat restoration. The Basinwide Recovery Strategy identifies short-term actions, timelines, and responsible Federal agencies. This biological opinion identifies the Action Agencies' contribution to the Basinwide Recovery Strategy.

Over the long term, the habitat strategy has three overarching objectives: 1) protect existing high-quality habitat, 2) restore degraded habitats on a priority basis and connect them to other functioning habitats, and 3) prevent further degradation of tributary and estuarine habitats and water quality. Estuarine protection and restoration must play a vital role in rebuilding the productivity of listed salmon and steelhead throughout the Columbia River basin. The states of Oregon and Washington, with congressional authorization under the CWA, have developed a Comprehensive Conservation and Management Plan through LCREP. The Federal agencies strongly support the actions of this plan that contribute to salmon recovery and seek to expand on them.

The following action items call on the Action Agencies, primarily the Corps and BPA, to play an important role in estuary restoration efforts. The Corps is meant to play a lead role, with BPA primarily providing cost-share funding. Corps and BPA actions are not meant to hinge on LCREP approval, but they are meant to be fully coordinated with LCREP.

Action 158: During 2001, the Corps and BPA shall seek funding and develop an action plan to rapidly inventory estuarine habitat, model physical and biological features of the historical lower river and estuary, identify limiting biological and physical factors in the estuary, identify impacts of the FCRPS on habitat and listed salmon in the

estuary relative to other factors, and develop criteria for estuarine habitat restoration.

A good deal is unknown about the ecology of the Columbia River estuary insofar as it affects listed species. It is important to develop a better understanding of historical salmon rearing patterns in the estuary; historical changes in the distribution, amounts, and classes of estuarine and floodplain habitat available to juvenile salmonids; variability in salinity, temperature, water depth, velocity, dissolved oxygen, and turbidity; habitat-salmon associations; sedimentation rates; salmon and habitat conditions in the transition zone; long-term variability and trends in the size, timing, and abundance of hatchery and wild out-migrants from the Columbia River; and the relative effects of inflow from upriver, changes in bathymetry due to the navigation channel, and changes in habitat due to other forms of development. Under this action item, the Corps and BPA are expected to develop programs to build an understanding of these matters and, in the relatively short term, to develop criteria for estuarine habitat restoration on the basis of the best available information.

Action 159: BPA and the Corps, working with LCREP and NMFS, shall develop a plan addressing the habitat needs of salmon and steelhead in the estuary.

BPA and the Corps, working with LCREP and NMFS, will develop specific plans for salmon and steelhead habitat protection and enhancement. These plans should contain clear goals for listed salmon conservation in the estuary, identify habitats with the characteristics and diversity to support salmon productivity, identify potential performance measures, identify flow requirements to support estuarine habitat requirements for salmon, and develop a program of research, monitoring, and evaluation. The plans should be completed by 2003.

Action 160: The Corps and BPA, working with LCREP, shall develop and implement an estuary restoration program with a goal of protecting and enhancing 10,000 acres of tidal wetlands and other key habitats over 10 years, beginning in 2001, to rebuild productivity for listed populations in the lower 46 river miles of the Columbia River. The Corps shall seek funds for the Federal share of the program, and BPA shall provide funding for the non-Federal share. The Action Agencies shall provide planning and engineering expertise to implement the non-Federal share of on-the-ground habitat improvement efforts identified in LCREP, Action 2.

Much of the complexity of the estuary's historical shallow-water habitat and much of the estuary's saltwater wetlands have been lost due to the effects of local, navigational, and hydropower development. LCREP proposes a 10-year program to protect and enhance high-quality habitat on both sides of the river to support salmon rebuilding. A high priority should be put on tidal wetlands and other key habitats to rebuild productivity in the lower 46 river miles. Federal agencies will provide technical and financial support for this program, and for implementing on-the-ground activities identified in planning.

As more information is gained from inventory and analytical work, the 10,000-acre goal may be modified to ensure that habitats that are determined to be important to the survival and recovery of anadromous fish are addressed. Examples of acceptable estuarine habitat improvement work include the following:

- Acquiring rights to diked lands
- Breaching levees
- Improving wetlands and aquatic plant communities
- Enhancing moist soil and wooded wetland by better management of river flows
- Reestablishing flow patterns that have been altered by causeways
- Supplementing the nutrient base by importing nutrient-rich sediments and large woody debris into the estuary
- Modifying the abundance and distribution of predators by altering their habitat
- Creating wetland habitats in sand flats between the north and south channels
- Creating shallow channels in intertidal areas
- Enhancing connections between lakes, sloughs, side channels, and the main channel

The Corps and BPA will put high priority on improving access to and the quality of chum habitat, especially in the Grays River. The work outlined in this action is in addition to any mitigation/restoration work that may be connected to the Corps' channel deepening project.

Action 161: Between 2001 and 2010, the Corps and BPA shall fund a monitoring and research program acceptable to NMFS and closely coordinated with the Conservation Reserve Enhancement Program monitoring and research efforts (Management Plan Action 28) to address the estuary objectives of this biological opinion.

Action 162: During 2000, BPA, working with NMFS, shall continue to develop a conceptual model of the relationship between estuarine conditions and salmon population structure and resilience. The model will highlight the relationship among hydropower, water management, estuarine conditions, and fish response. The work will enable the agencies to identify information gaps that have to be addressed to develop recommendations for FCRPS management and operations.

Action 163: The Action Agencies and NMFS, in conjunction with the Habitat Coordination Team, will develop a compliance monitoring program for inclusion in the first 1- and 5-year plans.

Compliance monitoring is necessary to determine how well management actions are implemented. From a regulatory perspective, compliance monitoring is necessary to ensure that agencies and individuals responsible for mitigation or restoration activities complete their responsibilities. From a biological perspective, NMFS must know how well a management action is implemented. If salmon do not respond, NMFS will be able to distinguish between management that did not work and management that was not implemented.

Some compliance monitoring will be conducted during the monitoring and evaluation program outlined in Section 9.6.5. However, not all sites will be checked at the appropriate intervals during this program. Therefore, the agency or party conducting each action will be responsible for keeping a log book of implementation, which is entered monthly into a web-based data archive. NMFS will randomly send out field staff to check on the log books and validate their entries.

12.6 STATUTORY REQUIREMENTS

The Magnuson-Stevens Act and Federal regulations (50 CFR Section 600.920) to implement the EFH provisions require Federal Action Agencies to provide a written response to EFH conservation recommendations within 30 days of receipt. Because the EFH designation for the Pacific salmon fishery has yet to be approved, this regulation does not apply for the salmon species involved in this consultation until the Secretary of Commerce approves it, at which time the 30-day period will begin. The final response must include a detailed description of measures proposed to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with the EFH conservation recommendations, an explanation of the reasons for not implementing them must be included.

12.7 CONSULTATION RENEWAL

The Action Agencies must reinitiate EFH consultation with NMFS if the action is substantially revised in a manner that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations (50 CFR Section 600.920 [k]).

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